

This print-out should have 14 questions. Multiple-choice questions may continue on the next column or page – find all choices before answering. The due time is Central time.

Please notice that for your homework to be considered towards your grade, it needs to be submitted one hour before the corresponding recitation starts. Work submitted after this time, but before the DUE DATE on top of this page, will be accepted but not graded.

PLEASE REMEMBER THAT YOU MUST CARRY OUT YOUR CALCULATIONS TO AT LEAST THREE SIGNIFICANT FIGURES. YOUR ANSWER MUST BE WITHIN ONE PERCENT OF THE CORRECT RESULT TO BE MARKED AS CORRECT BY THE SERVER.

Flux in a Rectangular Plane

24:01, trigonometry, numeric, > 1 min, normal.

001

An electric field of magnitude 3500 N/C is applied along the x axis.

Calculate the electric flux through a rectangular plane 0.35 m wide and 0.7 m long if the plane is parallel to the yz plane. Answer in units of $\text{N} \cdot \text{m}^2/\text{C}$.

002

Calculate the electric flux through the same rectangle, if it is parallel to the xy plane. Answer in units of $\text{N} \cdot \text{m}^2/\text{C}$.

003

Calculate the electric flux through the same rectangle, but now the rectangle contains the y axis and its normal makes an angle of 40° with the x axis. Answer in units of $\text{N} \cdot \text{m}^2/\text{C}$.

Flux Through a Loop 01

24:01, calculus, numeric, > 1 min, normal.

004

A 40 cm diameter loop is rotated in a uniform electric field until the position of maximum electric flux is found. The flux in this position is measured to be $520000 \text{ N} \cdot \text{m}^2/\text{C}$.

What is the electric field strength? Answer

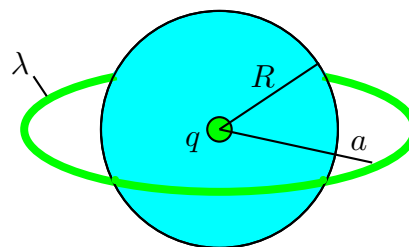
in units of N/C .

Point Charge and Charged Ring

24:02, trigonometry, numeric, > 1 min, normal.

005

A point charge $6 \mu\text{C}$ is located at the center of a uniform ring having linear charge density $17 \mu\text{C/m}$ and radius 3 m .



Determine the total electric flux through a sphere centered at the point charge and having radius R , where $R < a$, as shown. Answer in units of $\text{N} \cdot \text{m}^2/\text{C}$.

Charged Filament

24:03, trigonometry, numeric, > 1 min, normal.

006

The charge per unit length on a long, straight filament is $90 \mu\text{C/m}$.

Find the electric field 10 cm from the filament, where the distance is measured perpendicular to the length of the filament. Answer in units of N/C .

007

Find the electric field 20 cm from the filament. Answer in units of N/C .

008

Find the electric field 100 cm from the filament. Answer in units of N/C .

Charged Thin Spherical Shell

24:07, trigonometry, numeric, > 1 min, normal.

009

Consider a thin spherical shell of radius 14 cm with a total charge of $32 \mu\text{C}$ distributed uniformly on its surface.

Find the electric field 10 cm from the center

of the charge distribution. Answer in units of N/C.

010

Find the electric field 20 cm from the center of the charge distribution. Answer in units of N/C.

Charge on a Solid Sphere

24:07, calculus, numeric, > 1 min, normal.

011

A solid sphere of radius 40 cm has a total positive charge of $26\text{ }\mu\text{C}$ uniformly distributed throughout its volume.

Calculate the magnitude of the electric field at the center of the sphere. Answer in units of N/C.

012

Calculate the magnitude of the electric field 10 cm from the center of the sphere. Answer in units of N/C.

013

Calculate the magnitude of the electric field 40 cm from the center of the sphere. Answer in units of N/C.

014

Calculate the magnitude of the electric field 60 cm from the center of the sphere. Answer in units of N/C.